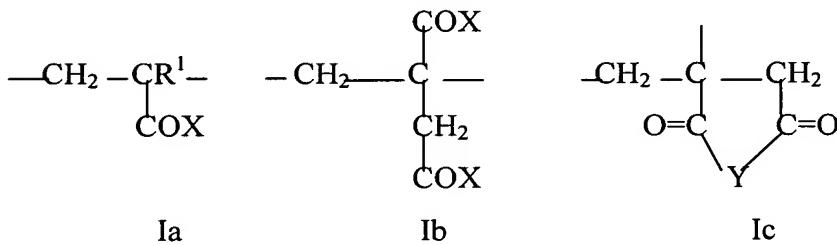


CLAIMS:

1. A fluidising admixture for use with sprayable cementitious compositions, the
admixture consisting of
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- (1) 2-phosphonobutane-1,2,4-tricarboxylic acid;
- (2) optionally, citric acid; and
- 10 (3) at least one polymer derived from ethylenically-unsaturated mono- or
dicarboxylic acids, and characterised in that the polymer consists of
 - a) 51-95 mole % of moieties of formula 1a and/or 1b and/or 1c



wherein R^1 = hydrogen or a C₁₋₂₀ aliphatic hydrocarbon residue;

X = O_a M, -O-(C_mH_{2m}O)_n-R², -NH-(C_mH_{2m}O)_n-R²,

M = hydrogen, a mono- or divalent metal cation, an ammonium ion or an organic amine residue;

25 a=0.5 or 1;

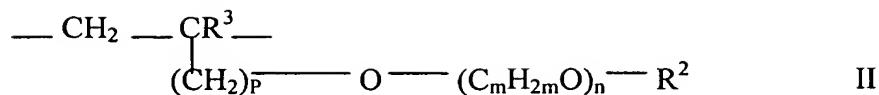
R^2 = hydrogen, C₁₋₂₀ aliphatic hydrocarbon, C₅₋₈ cycloaliphatic hydrocarbon or optionally substituted C₆₋₁₄ aryl residue;

$$Y = O, NR^2;$$

$m=2-4$; and

30 n= 0-200

b) 1-48.9 mole% of moieties of the general formula II

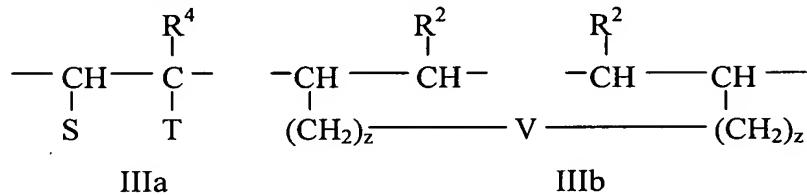


wherein R^3 = hydrogen or C_{1-5} aliphatic hydrocarbon;

5 p = 0-3; and

R^2 has the meaning given previously;

c) 0.1-5 mole % of moieties of Formulae IIIa or IIIb



wherein $S = H, -COO_aM, -COOR^5$

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$$T = U^1 - (CH_2 - CH_2 - O)_x - (CH_2 - CH_2 O)_y R^6$$

$$CH^3$$

$$-W - R^7$$

$$-\text{CO}-[\text{NH}-(\text{CH}_2)_3]_s-\text{W}-\text{R}^7$$

$$-\text{CO-O-(CH}_2\text{)}_z\text{-W-R}^7$$

$$-(\text{CH}_2)_z-\text{V}-(\text{CH}_2)_z-\text{CH}_2$$

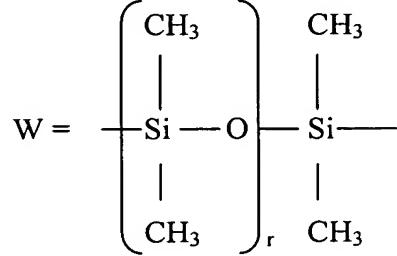
= -COOR⁵ when S is -COOR

$$U^1 \equiv -CO-NH_2 \cdot O \cdot -CH_2-O-$$

$$U^2 = \text{NH}_2\text{CO} - \text{O} - \text{OCH}_3$$

$V = 0.60 \text{ G.U.} \cdot 60 \text{ G. m.}$

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$$R^4 = H, CH_3$$

R^5 = a C_{3-20} aliphatic hydrocarbon residue, a C_5-C_8 cycloaliphatic hydrocarbon residue or a C_{6-14} aryl residue;

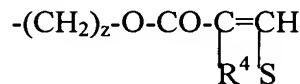
$R^6 = R^2, -CH_2-CH-U^2-C=CH$

$\begin{array}{c} | \\ R^4 \end{array} \quad \begin{array}{c} | \\ R^4 \end{array} \quad S$

5

$R^7 = R^2, -[(CH_2)_3-NH]_s-CO-C=CH$

$\begin{array}{c} | \\ R^4 \end{array} \quad S$



$\begin{array}{c} | \\ R^4 \end{array} \quad S$

10

wherein

$r = 2-100$

$s = 1, 2$

$z = 0-4$

$x = 1-150$

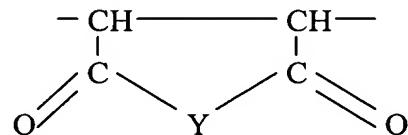
$y = 0-15$

15

d) 0-47.9 mole % of moieties of the general formula IVa and / or IV b:



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IVa

IVb

wherein a, M, X and Y have the significances hereinabove defined.

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2. A fluidising admixture according to claim 1, in which

a) the moiety is according to formula Ia;

R^1, R^2 are independently H or CH_3 ;

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$X = O_a M, -O-(C_m H_{2m}O)_n-R^2$

$M = H$ or a mono- or divalent metal cation;

$a = 1$;

$Y = O, NR^2$;

$m = 2-3$; and

n= 20-150;

b) R^2 , R^3 are independently H or CH_3 ; and

5 $p = 0-1;$

c) the moiety is according to formula IIIa;

S = H, -COO_aM, -COOR⁵

$$T = U^1 - (CH_2 - CH_2 - O)_x - \underset{CH^3}{\underset{|}{|}} (CH_2 - CH_2 O)_y R^6$$

10

$$-\text{CO}-[\text{NH}-(\text{CH}_2)_3]_s-\text{W}-\text{R}^7$$

$$-\text{CO-O-(CH}_2\text{)}_z\text{-W-R}^7$$

R^4, R^5 are independently H, CH_3 ;

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$$R^6 = R^2, -CH_2-CH(U^2)-C(R^4)=CH(R^4)S$$

$$R^7 = R^2, -[(CH_2)_3-NH]_s-CO-C(R^4)=CH_2$$

20

wherein

$$U^1 = -CO-NH-, -O-, -CH_2O-$$

$$U^2 = -NH-CO-, -O-, -OCH_2-$$

$x = 20-50$

$\mathbf{v} = 1\text{-}10$; and

25

$z = 0.2$.

3. A fluidising admixture according to claim 2, in which

a) the moiety is according to formula Ia;

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$$R^1 = H;$$

$$R^2 = CH_3$$

$$X = O_a M;$$

M = a mono- or divalent metal cation:

Y= O, NR²;

m = 2; and

n = 25-50;

5 b) R², R³ = H; and

p = 0;

c) the moiety is according to formula IIIa;

S = H, -COO_aM;

10 T = U¹-(CH-CH₂-O)_x- (CH₂-CH₂O)_yR⁶

$$\begin{array}{c} | \\ \text{CH}^3 \end{array}$$

-CO-O-(CH₂)_z-W-R⁷

R⁴, R⁵ = H;

R⁶ = R², -CH₂- $\begin{array}{c} | \\ \text{CH} \end{array}$ -U²- $\begin{array}{c} | \\ \text{C}=\text{CH} \end{array}$

$$\begin{array}{c} | \\ \text{R}^4 \end{array} \quad \begin{array}{c} | \\ \text{R}^4 \end{array} \quad \begin{array}{c} | \\ \text{S} \end{array}$$

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R⁷ = R², -[(CH₂)₃-NH]_s-CO- $\begin{array}{c} | \\ \text{C}=\text{CH} \end{array}$

$$\begin{array}{c} | \\ \text{R}^4 \end{array} \quad \begin{array}{c} | \\ \text{S} \end{array}$$

20

-(CH₂)_z-O-CO- $\begin{array}{c} | \\ \text{C}=\text{CH} \end{array}$

$$\begin{array}{c} | \\ \text{R}^4 \end{array} \quad \begin{array}{c} | \\ \text{S} \end{array}$$

wherein

U¹ = -CO-NH-;

U² = -NH-CO-, -O-, -OCH₂-

x = 20-50;

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y = 5-10; and

z = 1-2.

4. A method of imparting flow to a cementitious composition, comprising the addition thereto of an admixture according to any one of claims 1-3.

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5. A method of spraying a cementitious composition by preparing a cementitious mix and conveying the mix to a spray nozzle, there being added to the mix at preparation an admixture according to claim 1.